

Knowledge and attitudes of Korean dentists towards human immunodeficiency virus/acquired immune deficiency syndrome

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Purpose: Infection with human immunodeficiency virus (HIV) remains a major global threat, and although the prevalence is comparatively still very low, the number of HIV-positive Koreans is increasing. However, there are no official guidelines as to how to treat people living with HIV/acquired immunodeficiency syndrome (AIDS) (PLWHA) or how to screen for potentially infectious people. This study assessed the level of knowledge and attitudes of dentists in Korea toward PLWHA, and their attitudes to screening patients for HIV infections.

Methods: A cross-sectional prospective survey targeting dentists working in Korea was conducted using a self-administered questionnaire.

Results: A satisfactory level of knowledge about HIV/AIDS and a relatively positive attitude toward PLWHA was found. Most of the respondents preferred rapid HIV testing using oral fluid as a specimen. The general attitude of dentists toward HIV/AIDS is sufficiently positive to enable provision of the best treatment to the patients in need.

Conclusions: Most of the dentists require HIV testing in dental clinics. In spite of their needs, there are several obstacles. It is hoped that financial considerations and official legal requirements related to HIV testing strategies will be considered.

Keywords: Acquired immunodeficiency syndrome, AIDS-related opportunistic infections, Data collection, HIV long-term survivors, HIV.

INTRODUCTION

Since important progress has been made in preventing new human immunodeficiency virus (HIV) infections, the annual number of acquired immunodeficiency syndrome (AIDS)-

related deaths has been decreased, and the number of people living with HIV continues to increase. Worldwide, more than 6,800 people become infected with HIV every day and more than 5,700 individuals die from AIDS [1]. Since the first case report of HIV infection in 1985 [2], the number of accumulat-

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Table 1. Reported number of people newly infected with human immunodeficiency virus.

	1985-1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Total accumulation (n=6,120)	517	105	124	129	186	219	327	398	534	610	680	750	744	797
Men (n=5,604)	453	93	107	111	160	194	292	363	502	557	640	688	701	743
Women (n=516)	64	12	17	18	26	25	35	35	32	53	40	62	43	54
Annual increase rate (%)		-1.9	18.1	4.0	44.2	17.7	49.3	21.7	34.2	14.2	11.5	10.3	-0.8	7.1

Table 2. Demographic characteristics of the respondents (n=475).

Characteristics	No. (%)
Age (years)	
20-29	51 (11)
30-39	193 (41)
40-49	156 (33)
≥50	75 (15)
Gender	
Male	341 (72)
Female	134 (28)
Type of practice	
Private clinic	344 (72)
Teaching hospital	55 (12)
Public dental care service	41 (9)
Dental hospital	35 (7)
Personal experience of receiving HIV test	
None	354 (74)
1	74 (16)
2	18 (4)
≥3	29 (6)

HIV: human immunodeficiency virus.

ed infected patients in the Republic of Korea is 6,120 as of December 2008 [3], of which 1,084 of the patients have died. Compared to western countries and sub-Saharan Africa, HIV prevalence is comparatively low, but the epidemic is steadily expanding from specific populations such as injecting drug users, sex workers, and homosexual men into lower risk populations by transmission to the sexual partners of those most at risk [4]. The important issue is that the number of newly reported HIV infection cases are increasing every year with a changing epidemic pattern (Table 1), but dental care workers are unprepared to treat this increasing number of people living with HIV/AIDS (PLWHA) [5].

In Korea, as in many other countries, people with HIV frequently encounter discrimination in everyday life as well as when seeking and receiving health care services. Forty percent of the general public reported that "They would not sit together at the same table" and 48.5% reported that "PLWHA should be isolated from non-infected people" [6,7]. Even 78.9% of healthcare workers answered "PLWHA have lifestyles that are morally wrong" and 67.7% answered that "PLWHA should

be isolated" [8,9]. The knowledge and attitudes of healthcare workers in relation to HIV infection is an important factor influencing the willingness and ability of people with HIV to access medical care and the quality of the care they receive. There have been several studies conducted evaluating dental workers' knowledge about AIDS and their attitudes towards HIV-infected patients [10-17].

The Centers for Disease Control in the United States introduced the concept of universal precautions for dental infection control protocols to decrease fears and remove barriers to care in 1993 [18]. In Japan, the 1996 protocol for education on infection control for HIV-related patients recommends that dental care workers assume that all patients are potentially infectious [19]. However, there have been no official guidelines regarding how to care for PLWHA in the dental clinic and, surprisingly, research on HIV or AIDS from the dentistry perspective is almost nonexistent in Korea.

The subject of this study is the evaluation of the knowledge and attitudes of Korean dentists towards HIV and the compilation of their opinions on HIV/AIDS policy.

MATERIALS AND METHODS

Data collection was done with the use of a standardized self-administered questionnaire, which covered demography, knowledge of HIV transmission, occupational vulnerability, infection control, and opinions on HIV/AIDS policy. Five hundred survey questionnaires were sent out at around the same time to limit a bias due to changes over time and mailed only to dentists belonging to the Korean Dental Association. In total, 475 replies were received and the data were analyzed anonymously.

RESULTS

As shown in Table 2, a total of 475 Korean dentists took part in the study, and 74% of respondents were between the ages of 30 and 50 years. The study population consisted of 341 males (72%) and 134 females (28%). As for the type of practice, a majority of the dentists (72%) were running private clinics, followed by teaching hospitals (12%).

Knowledge of HIV transmission

The dentists were asked to answer true or false to 23 statements regarding possible routes of HIV transmission (Table 3). Correct responses were scored as one and incorrect responses as zero. An overall knowledge score was calculated by summing the scores for each statement, and the highest possible score was 23. The average was 18.78 ± 2.46 . Many dentists mistakenly believed that HIV could not be transmitted by mother's breast milk and was not aware of the fact that HIV detection was possible from oral mucosa.

Attitudes towards HIV/AIDS

As shown in Table 4, a majority of respondents (93%) answered that they had not treated an HIV-infected person within the past year, but 61% were not sure about the infection state of the patients. Of the dentists who have experienced treating an HIV-infected person, treatment plans were

equally distributed over various options, such as referring to specialists, relieving only chief complaints, and treating just like a non-infected person.

While 88% answered they do not test their patients for HIV infection, 89% of respondents thought HIV testing was necessary in the dental clinic and 80% stated that the reason for needing HIV testing in the dental clinic was to prevent cross contamination among patients and between patients and dental care workers. Pricking with sharp instruments after usage with HIV-infected and AIDS patients is one of the sources of HIV infection [8]. Eighty-four percent of respondents answered they were pricked by sharp instruments at least once a year. As for the type of HIV test, 86% preferred non-invasive tests using oral fluid specimens collected by swabbing the outer surface of the upper and lower gums. Slightly more than half of the dentists (59%) answered that HIV testing should be performed before every routine dental procedure

Table 3. Response scores to questions concerning HIV/AIDS (n=475).

What do you think the possible infection source of HIV is?		Yes	No
Q1	Do you think that it is possible to be infected with HIV by semen or vaginal fluid?	406 (85) ^{a1}	69 (15)
Q2	Do you think that it is possible to be infected with HIV by saliva?	175 (37)	300 (63) ^{a1}
Q3	Do you think that it is possible to be infected with HIV by blood?	471 (99) ^{a1}	4 (1)
Q4	Do you think that it is possible to be infected with HIV by urine?	51 (11)	424 (89) ^{a1}
Q5	Do you think that it is possible to be infected with HIV by tears?	74 (16)	401 (84) ^{a1}
Q6	Do you think that it is possible to be infected with HIV by mother's breast milk?	134 (28) ^{a1}	341 (72)
What do you think of possible routes of HIV infection?		Yes	No
Q7	Do you think that it is possible to be infected with HIV by transfusion from an HIV-infected person?	474 (100) ^{a1}	1 (0)
Q8	Do you think that it is possible to be infected with HIV by having sexual intercourse with an HIV-infected person?	451 (95) ^{a1}	24 (5)
Q9	Do you think that it is possible to be infected with HIV by kissing an HIV-infected person?	156 (33)	319 (67) ^{a1}
Q10	Do you think that it is possible to be infected with HIV by using the same bath that an HIV-infected person has used?	35 (7)	440 (93) ^{a1}
Q11	Do you think that it is possible to be infected with HIV by using the same toilet that an HIV-infected person has used?	39 (8)	436 (92) ^{a1}
Q12	Do you think that it is possible to be infected with HIV by using the same dishes that an HIV-infected person has used?	40 (8)	435 (92) ^{a1}
Q13	Do you think that it is possible to be infected with HIV by shaking hands or hugging an HIV-infected person?	5 (1)	470 (99) ^{a1}
Q14	Do you think that it is possible to be infected with HIV by being bitten by a mosquito which has previously bitten a HIV-infected person?	209 (44)	266 (56) ^{a1}
What are the specimens which could be used to confirm a diagnosis of AIDS?		Yes	No
Q15	Do you think that AIDS can be diagnosed using semen or vaginal fluid?	349 (73) ^{a1}	126 (27)
Q16	Do you think that AIDS can be diagnosed using saliva?	195 (41)	280 (59) ^{a1}
Q17	Do you think that AIDS can be diagnosed using blood?	464 (98) ^{a1}	11 (2)
Q18	Do you think that AIDS can be diagnosed using urine?	61 (13)	414 (87) ^{a1}
Q19	Do you think that AIDS can be diagnosed through oral mucosa?	228 (48) ^{a1}	247 (52)
Q20	Do you think that AIDS can be diagnosed using tears?	55 (12)	425 (88) ^{a1}
Q21	Do you think that AIDS can be diagnosed through the skin?	21 (4)	454 (96) ^{a1}
Q22	Do you think that AIDS can be diagnosed using spit?	61 (13)	414 (87) ^{a1}
Q23	Do you think that AIDS can be diagnosed through respiration?	5 (1)	470 (99) ^{a1}

Values are presented as number (%).

HIV: human immunodeficiency virus, AIDS: acquired immunodeficiency syndrome.

^{a1}Correct answers.

Table 4. Fear and attitudes towards HIV/AIDS (n=475).

No.	Question contents	No. (%)
Q1	Are you threatened with infectious diseases by patients' saliva or blood during dental procedures?	
	Almost everyday	77 (16)
	1-2 times per week	126 (27)
	1-2 times per month	192 (40)
	1-2 times per year	65 (14)
	Never	15 (3)
Q2	How many times were you pricked by sharp dental instruments last year?	
	None	74 (16)
	Less than 5 times	50 (11)
	5-10 times	325 (68)
	10-20 times	15 (3)
	Above 20 times	11 (2)
Q3	Did you experience treatment of patients with HIV infection/AIDS last year? And how many patients?	
	None, and no possibility	153 (32)
	None, but possibility exists	288 (61)
	1 patient	16 (3)
	2-5 patients	14 (3)
	5-10 patients	1 (0)
	Above 10 patients	3 (1)
Q4	How did you treat patients with HIV infection/AIDS?	
	No experience	373 (78)
	Same as non-infected patients	21 (4)
	Treatment cautiously in isolated rooms after patient's agreement	32 (7)
	Relieving chief complaint and referring to specialists	22 (5)
	Referring to specialists due to unsuitable treatment conditions	27 (6)
Q5	How do you diagnose HIV or AIDS now?	
	Blood	21 (5)
	Oral mucosa	29 (6)
	Both blood and oral mucosa	6 (1)
	No test	419 (88)
Q6	Do you think that a pre-screening diagnosis test of HIV is needed in dental clinics?	
	Sure	421 (88)
	Not yet	46 (10)
	No need	8 (2)
Q7	What is the most important reason for a pre-screening diagnosis test of HIV in dental clinics?	
	No need	24 (5)
	Prevention of cross-contamination between HIV-infected person and other patients	188 (40)
	Early detection of HIV-infection leading to early treatment of HIV infection	25 (5)
	Prevention of cross-contamination between dentist (dental equipment) and HIV-infected person	190 (40)
	Proper treatment for HIV-infected and AIDS patients	8 (2)
	Protection of spread of AIDS for public health	40 (8)
Q8	Which do you prefer to use for AIDS testing?	
	Blood	49 (11)
	Oral mucosa	410 (86)
	Other	5 (1)
	Anything	11 (2)

(Continued to the next page)

Table 4. (Continued from the previous page) Fear and attitudes towards HIV/AIDS (n = 475).

No.	Question contents	No. (%)
Q9	Which kind of dental procedures do you think that a pre-screening diagnosis test of HIV is needed before?	
	Oral surgery	156 (33)
	Scaling and oral prophylaxis	17 (4)
	Operative dentistry	1 (0)
	Prosthetic dentistry	0
	Orthodontic dentistry	0
	Endodontic dentistry	4 (1)
	Every routine dental procedure	278 (58)
	No need	8 (2)
Q10	What do you think of cross-contamination after treatment of HIV infected/AIDS patients?	
	Large risk despite routine disinfection and sterilization	136 (29)
	Low risk with careful disinfection and sterilization	271 (57)
	Very low risk with routine disinfection and sterilization	68 (14)
	No risk	0
Q11	What is your plan for patients with HIV infection/AIDS?	
	Screening before dental treatment	238 (50)
	Use of self-protectors	108 (23)
	Use of disposable or disinfected instruments	21 (4)
	AIDS diagnosis before dental treatment	36 (8)
	Cautious treatment during procedures	72 (15)
Q12	What is the most urgent problem to solve for AIDS testing in dental clinics?	
	Education on AIDS testing for dental clinics	95 (20)
	Continuing medical/public health care after diagnosis of AIDS at dental clinics	89 (19)
	Supplying medical information to HIV-infected patients and those with AIDS	40 (8)
	A system for referring HIV-infected patients and those with AIDS to specialists	61 (13)
	Dental treatment principles for preventing the spread of AIDS and HIV	97 (20)
	Support for AIDS testing from health insurance	93 (20)

HIV: human immunodeficiency virus, AIDS: acquired immunodeficiency syndrome.

and 33% answered that only oral surgeries required HIV testing before operation.

DISCUSSION

HIV and AIDS are widely spread infectious diseases and the number of people living with HIV worldwide has continued to increase, reaching an estimated 33.4 million. Compared to 1990, the total number of people living with the virus in 2008 was approximately threefold higher [4]. Due to the advancement of medical treatment, acute and fatal HIV infection has been transformed into a chronic disease which requires management and monitoring. Consequently, there are more chances for dental care workers to meet PLWHA in clinics, and the workers should be prepared with knowledge and the appropriate attitude.

The results of this study showed that the average level of knowledge was high, reflecting a correct understanding of

the mechanisms of HIV infection. However, some of the respondents did not know that saliva cannot transmit the virus. Dental care workers who deal daily with patients' saliva tend to be unwilling to treat PLWHA when they do not know that the viral load in saliva is so low that it cannot transmit the HIV virus. Therefore, it is important for dental care workers to be well equipped with up-to-date information, treatment strategies, and knowledge of resources available.

It is generally accepted that attitudes are affected by the level of knowledge. Most of the studies on HIV/AIDS have investigated attitudes in combination with the level of knowledge, and have concluded that more and continuous education is required to change negative attitudes towards PLWHA. However, Mitchell [20] reported that knowledge alone does not seem to change the attitude of most health care professionals, as some of them still experienced difficulty in establishing good relationship with AIDS patients. The study also showed that the level of knowledge was high enough for the

dentists to continue proper infection control and care for PLWHA. However, the respondents answered that they avoid active treatment or seek referrals as much as they treat like healthy people. The motivation to care for the possibly infected person does not seem to come from a high level of knowledge, and solutions should seek to change the attitude of dentists and to encourage the proper and the best treatment for PLWHA.

HIV testing prior to dental treatment and knowledge about patients' infection state can reassure dentists and allow them to confidently do their jobs. Up to now, several types of HIV testing have been developed that use whole blood or an oral fluid specimen. One of the latest types of testing is OraQuick Advance, which detects antibodies to HIV-1 and HIV-2 in oral fluid. The manufacturer indicates a specificity of 99.8% with oral fluid and 100% with whole blood. In this report, 86% of respondents answered they preferred using this product for its non-invasive method of application. Also, 89% of respondents said they believe that HIV testing is necessary in the dental clinic, even though 88% were not currently testing their patients for HIV infection. This reveals a major contradiction between the ideal and reality, and it seems that there are certain obstacles to initiating patient HIV infection testing in dental clinics.

First, it should be determined that who will pay for the test. The HIV and AIDS prevalence is low in Korea relative to other countries and public attention regarding infection has not been widely aroused. Therefore, a prudent policy should be developed regarding costs in order to prevent a misunderstanding that dentists benefit much more than patients from this test, since the possibility of the cross infection from patient to dentist is greater than the possibility of the cross infection from patient to patient. Covering the costs of testing using national insurance would ensure that dentists could routinely test their patients and detect undiagnosed HIV-infected people. Second, getting consent from patients to test for HIV infection before dental treatment can cause unexpected problems in clinics. Negative perception of HIV/AIDS is dominant among Korean people and asking for consent for HIV testing can be taken as a humiliating question. Also, most people do not understand why HIV testing is performed at dental clinics. The perceived value of HIV testing by patients appears to be quite low due to the belief that HIV infection is rare. Therefore, general education for the public should be combined with systematic support to provide HIV testing in dental clinics.

Recent advances in HIV medical management have transformed HIV infection from a fatal and terminal disease into a chronic illness requiring continued management and careful monitoring. However, dentists and dental care workers'

general perception is still negative despite a high level of knowledge. Routine HIV testing in dental clinics would help dentists to change negative attitudes towards PLWHA and provide the best treatment when financial and systematic support is provided from the government.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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